

Run 14 RHIC Machine/Experiments Meeting

25 Feb 2014

Agenda:

- **Run 14 Schedule** (Pile)
- **Machine Status** (Montag)
- **STAR and PHENIX Status** (Experiments)
- **Other**


Call in bridge line is 631-344-8383

Run 14 plan based on 22 weeks cryo operation

and Fischer et.al. RHIC Collider Projections (FY 2013 – FY 2017), 4 Jun 2013

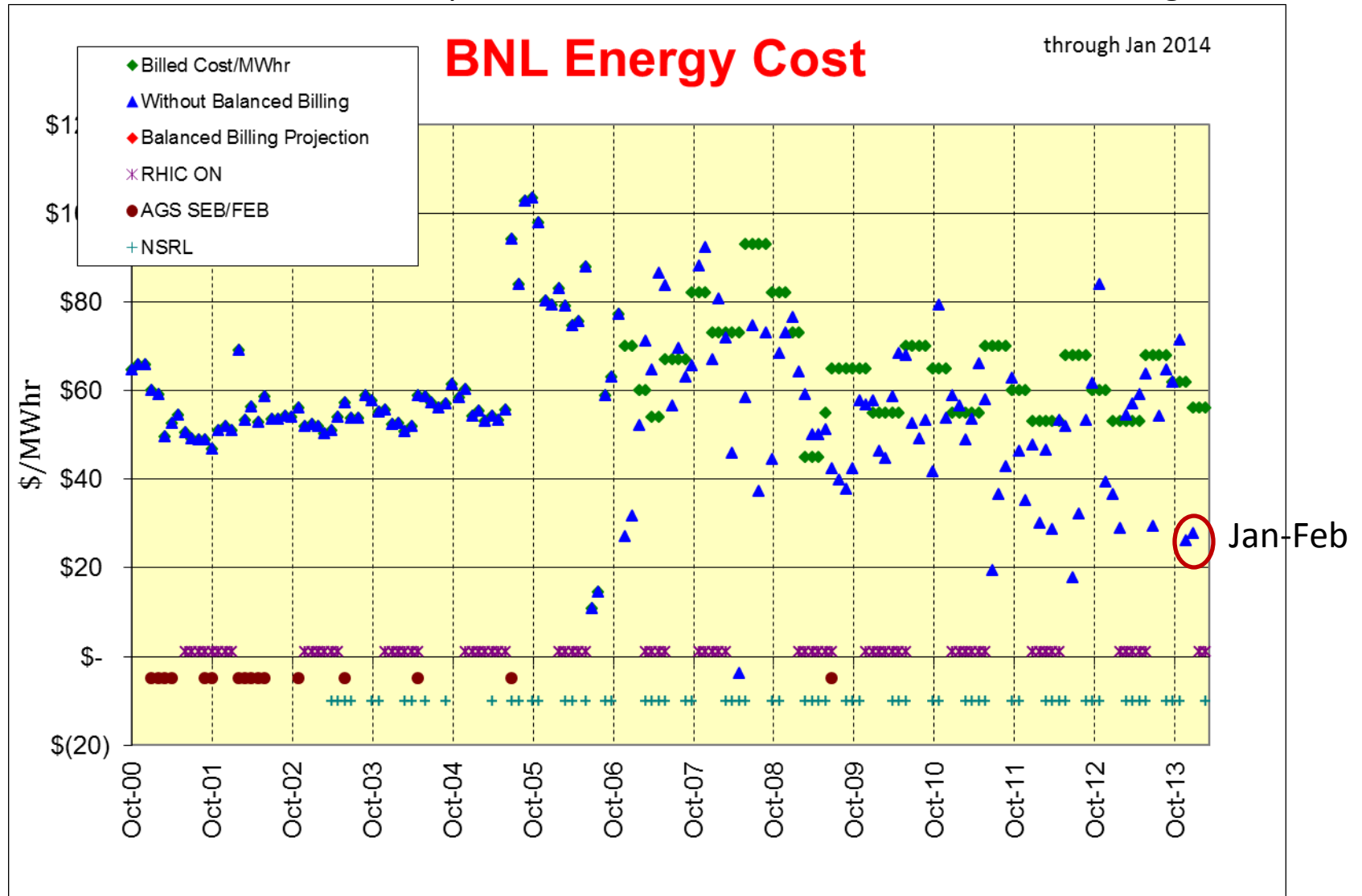
- ✓ 3 Feb, Begin cool-down to 4.5K
- ✓ 4 Feb, Cool-down to 6K in Blue
- ✓ 7 Feb, Blue and Yellow at 4.5 deg K
- ✓ 10-Feb, Beam in Blue and Yellow at injection
- ✓ 15-Feb, Begin $\sqrt{s} = 14.6$ GeV/n AuAu physics

today, 25 Feb... changed

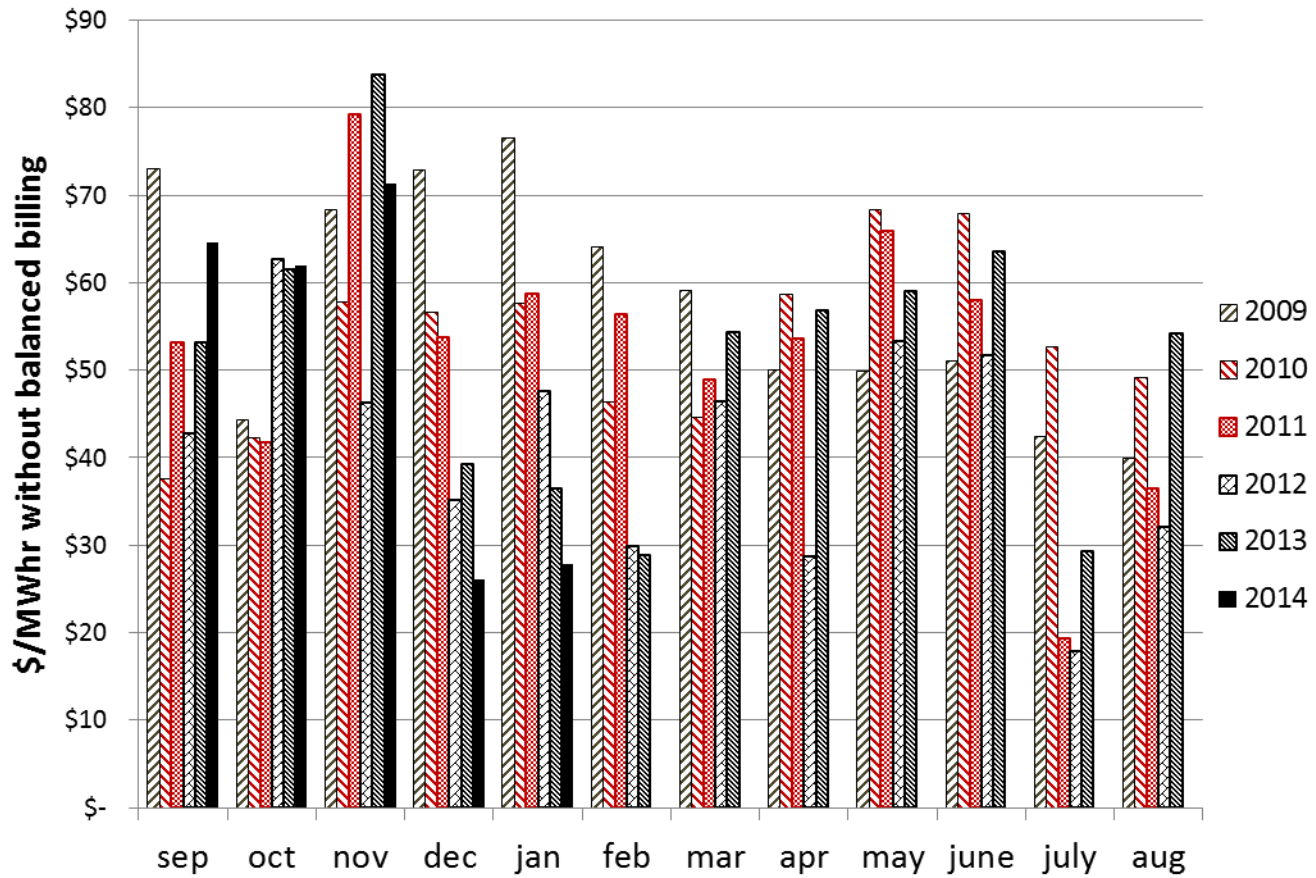
-  8-10 Mar (Monday), End $\sqrt{s} = 14.6$ GeV/n AuAu physics run begin setup for $\sqrt{s} = 200$ GeV/n AuAu
- 14-Mar, Begin $\sqrt{s} = 200$ GeV/n AuAu run
- 27-Jun, End 15 week $\sqrt{s} = 200$ GeV/n AuAu run
- 27-June through 4 July , 7 days contingency/TBD
- 4-July, begin cryo warm-up
- 7- July, warm-up complete, 22.0 cryo weeks of operation

See <http://www.rhichome.bnl.gov/AP/RHIC2014/> for the Run Coordinator's detailed plan

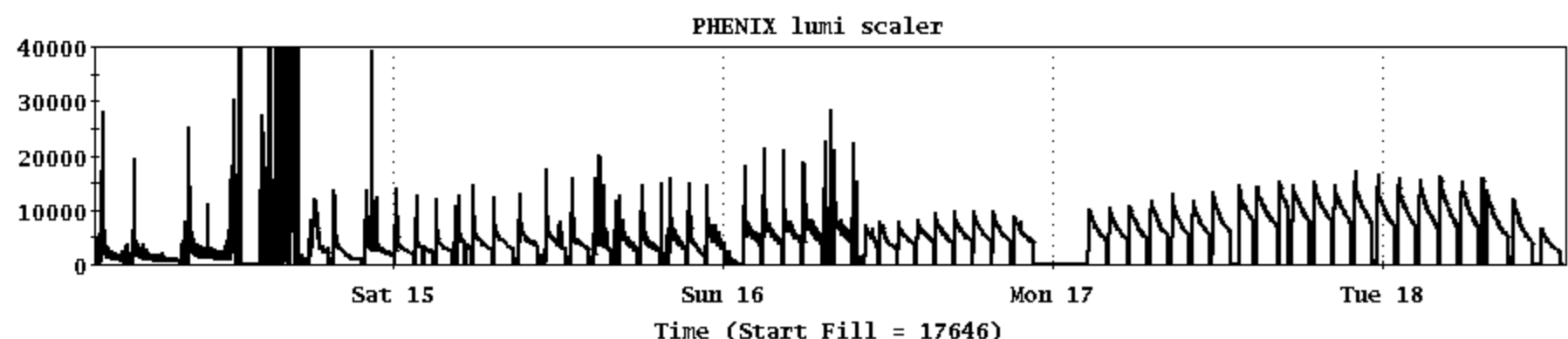
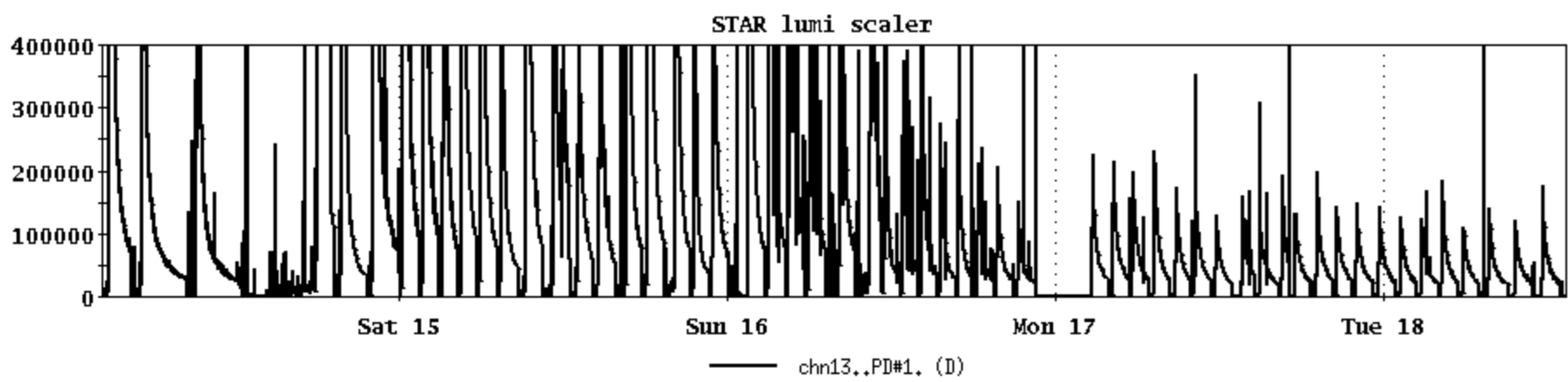
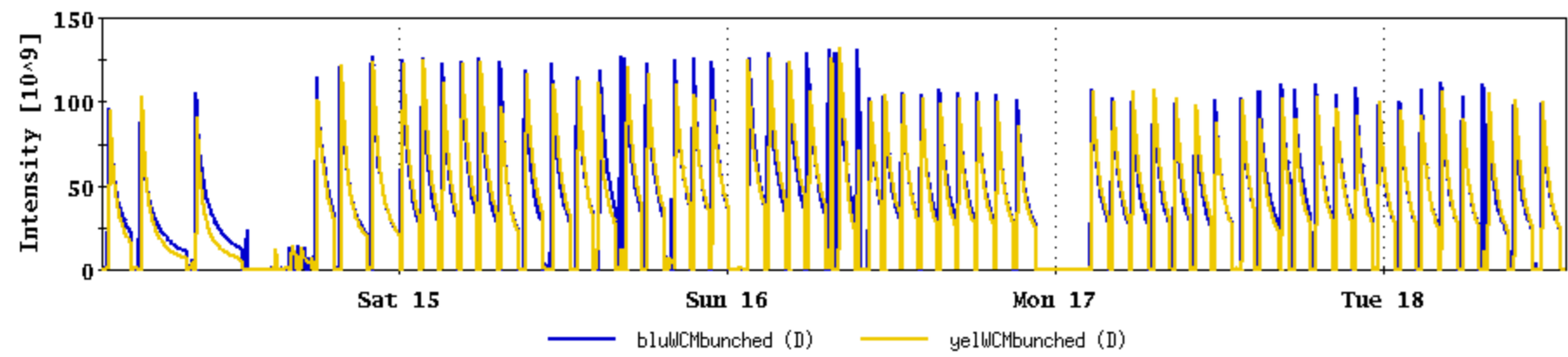
FY 2014 power rebate \$ in BNL bank = \$1.07M, through Jan



BNL Electricity Cost

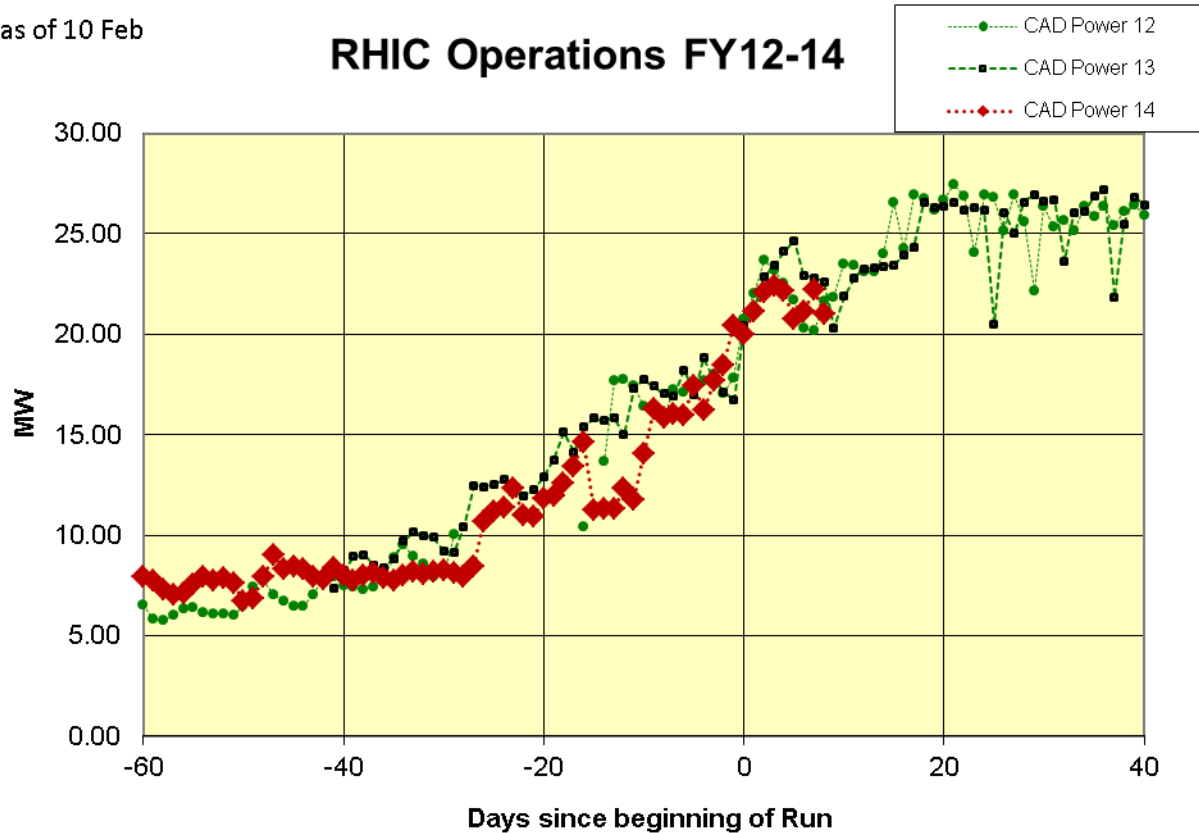


Archive



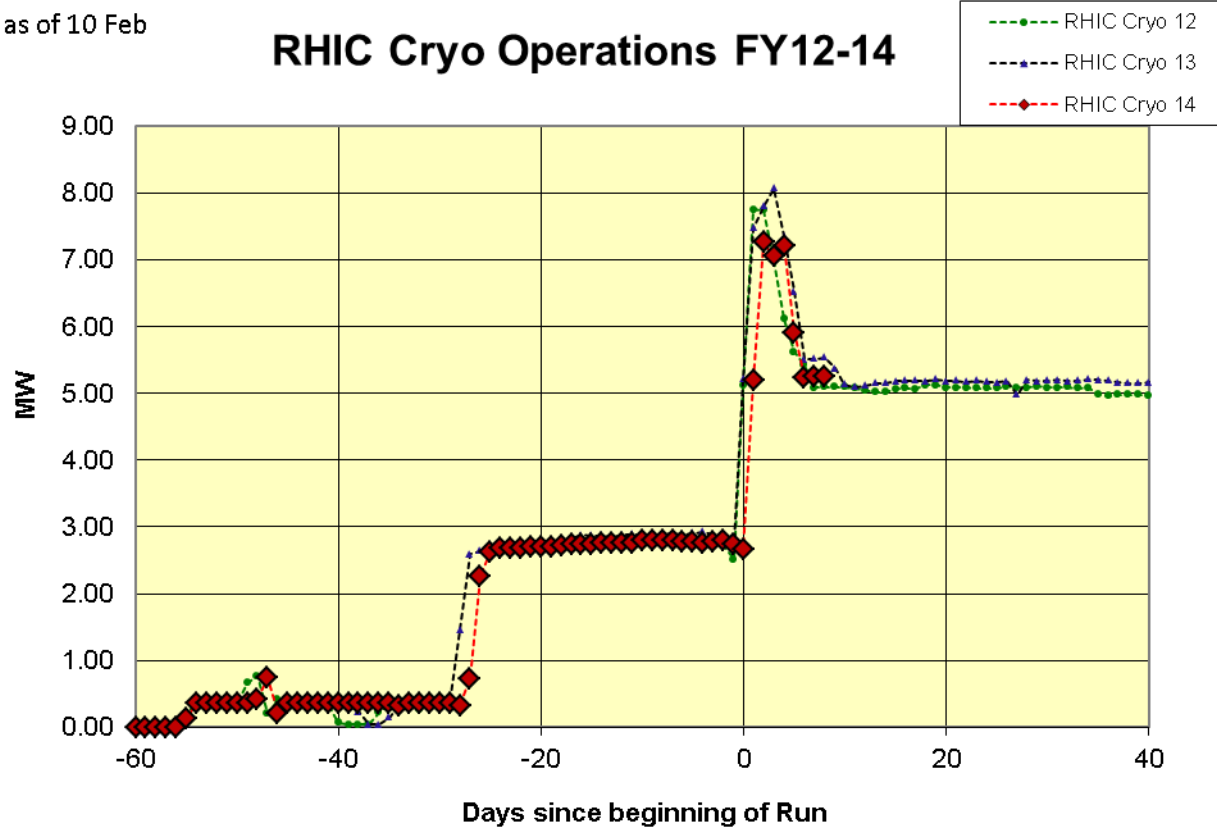
as of 10 Feb

RHIC Operations FY12-14



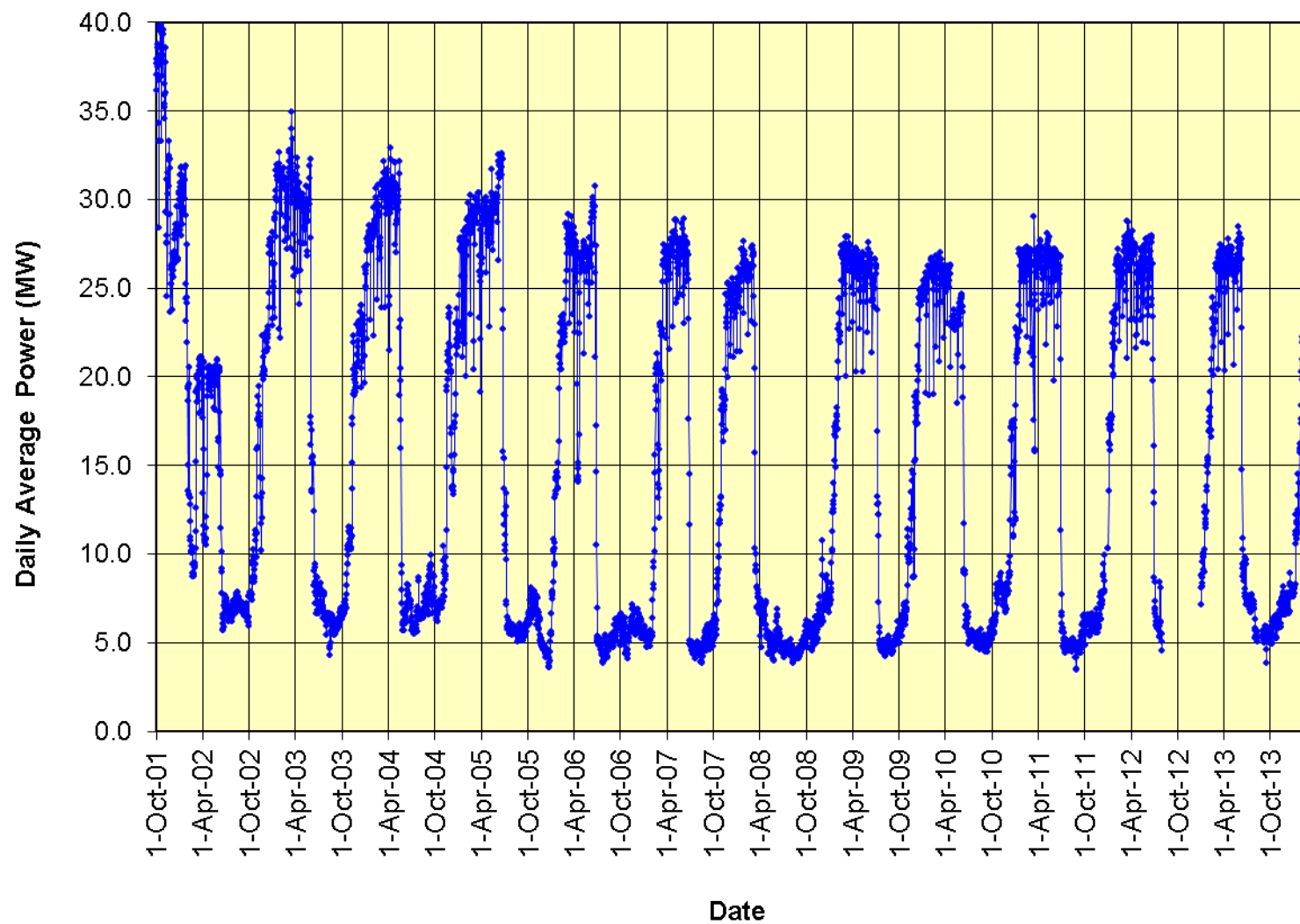
as of 10 Feb

RHIC Cryo Operations FY12-14



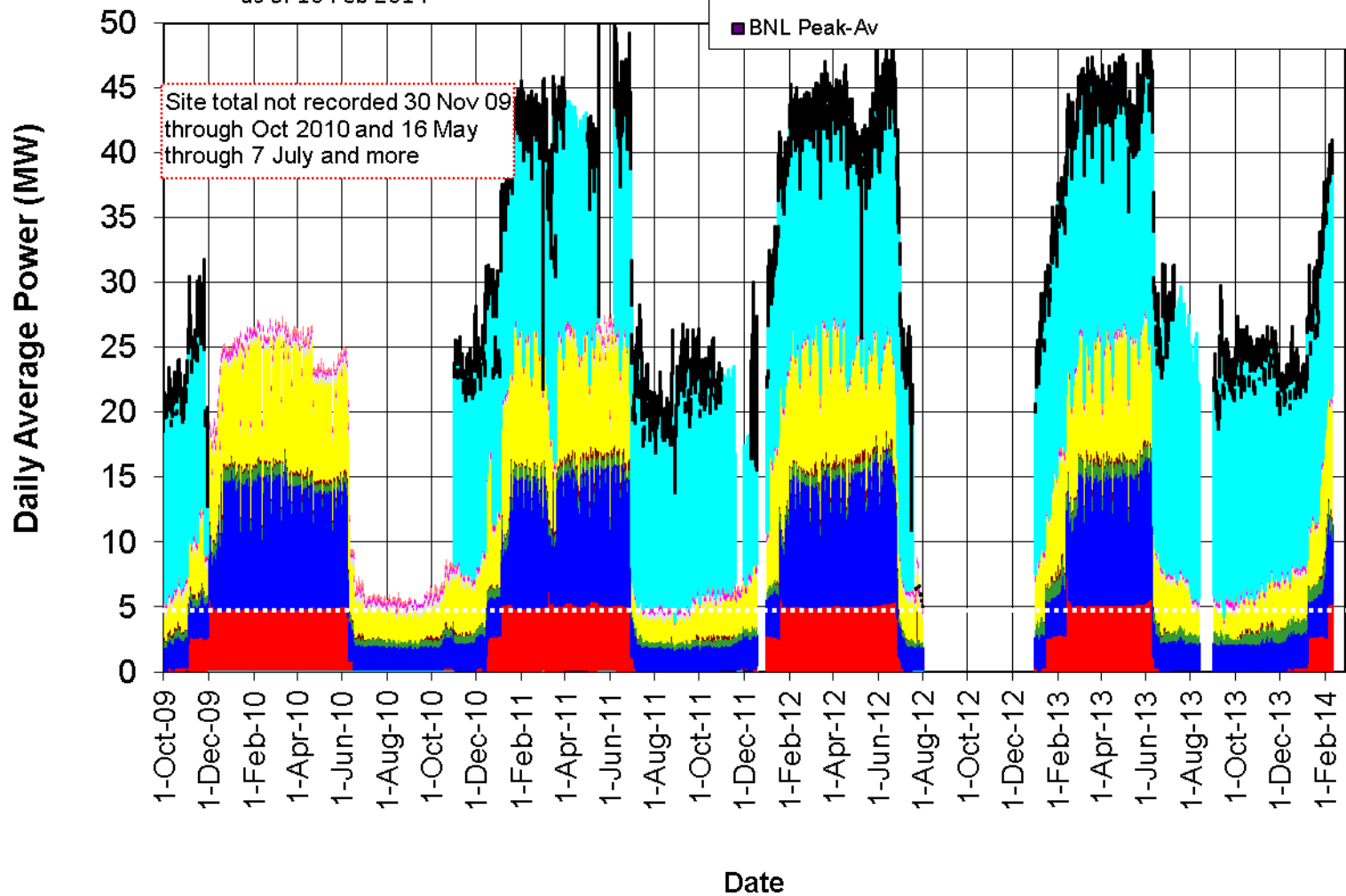
as of 10 Feb 2013

C-AD Energy Use FY 2002-14



BNL Energy Use FY 2010-14

as of 10 Feb 2014



Goals for Run 14 (based on Beam Use Requests)

(11 Feb, DRAFT, to be updated by experiments)

PHENIX

- Au+Au @ 200 GeV for 12 weeks, $L = 1.5 \text{ nb}^{-1}$ sampled luminosity within $|z| < 10 \text{ cm}$
 - ~30% within $|z| < 10 \text{ cm}$
 - ~90% DAQ efficiency
 - ~50% bandwidth, DAQ saturation factor (?)
 - 11 nb^{-1} delivered

STAR

- Au+Au @ 200 GeV for 14 weeks, $L = 10 \text{ nb}^{-1}$ recorded, 10^9 min bias triggers within $|z| < 5 \text{ cm}$ → (2×10^9 triggers required)
 - ~ 60% sampling efficiency
 - 16.7 nb^{-1} delivered
- Au+Au @ 15 GeV for 3 weeks, 1.5×10^8 min bias triggers

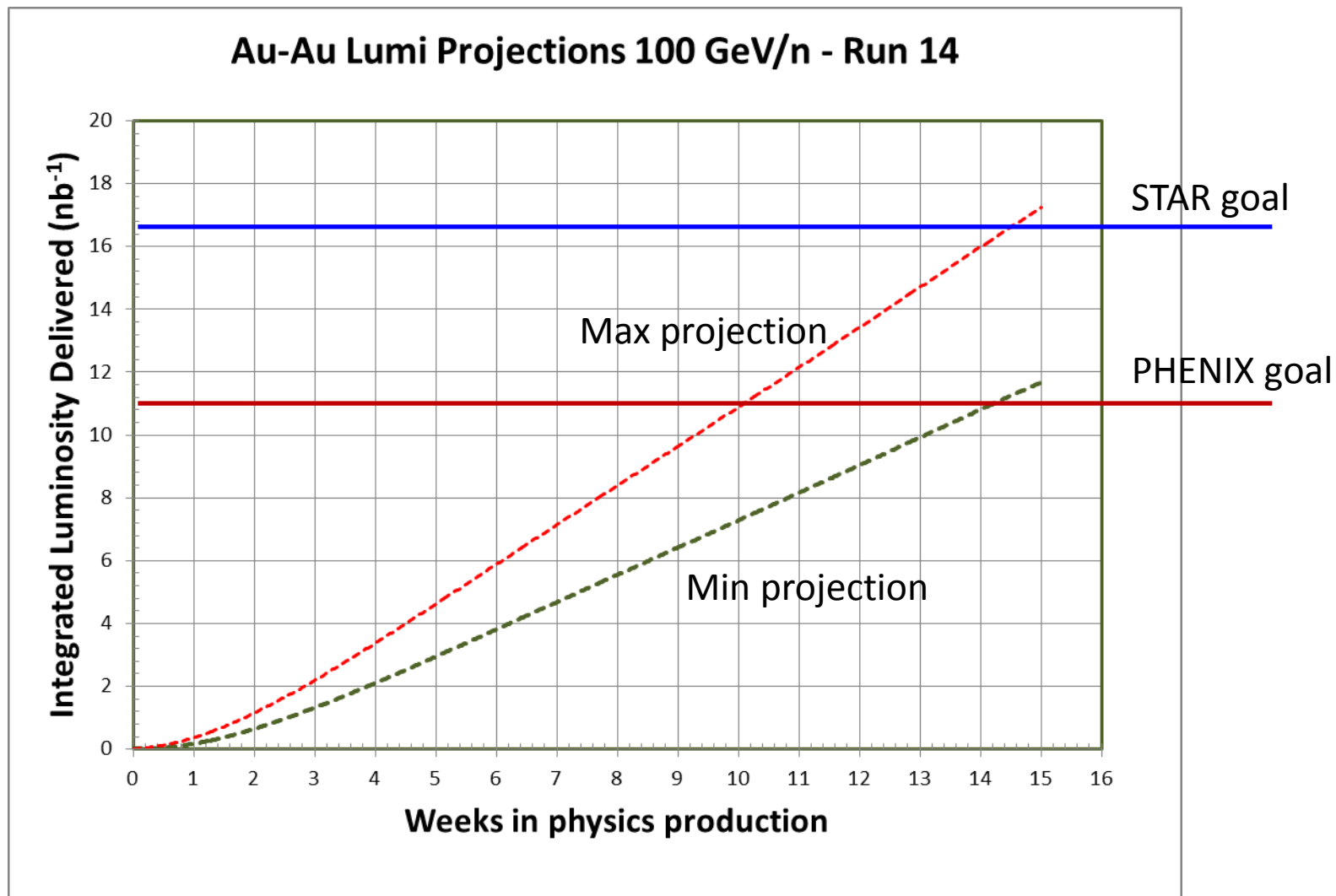


Table 2: Maximum luminosities that can be reached after a sufficiently long running period. The beam energy is stated. Other ion combinations can be estimated on demand. For species combinations not yet run the minimum luminosities are approximately 50% of the maximum.

Mode	Beam energy [GeV/n]	No of colliding bunches	Ions/bunch [10 ⁹]	β^* [m]	Emittance [mm]	L_{peak} [cm ⁻² s ⁻¹]	$L_{\text{store avg}}$ [cm ⁻² s ⁻¹]	L_{week}
Pb-Pb	98.3	111	1.1	0.7	23→8	20×10 ²⁶	17×10 ²⁶	0.6 nb ⁻¹
Au-Au	100	111	1.4	0.7	23→8	40×10 ²⁶	35×10 ²⁶	1.2 nb ⁻¹
h-Au *	100	111	20 / 1.3	0.8	20→23	8×10 ²⁸	5×10 ²⁸	16 nb ⁻¹
d-Au *	100	111	110 / 1.4	0.8	17→25	47×10 ²⁸	28×10 ²⁸	95 nb ⁻¹
p↑-C	100	111	180 / 20	0.8	18→23	10×10 ³²	7×10 ³²	2.3 pb ⁻¹
p↑-Cu	100	111	180 / 4.0	0.8	18→23	200×10 ²⁸	150×10 ²⁸	475 nb ⁻¹
p↑-Au	100	111	180 / 1.4	0.8	18→23	70×10 ²⁸	50×10 ²⁸	165 nb ⁻¹
p↑-p↑*	100	107	160	0.85	17→25	65×10 ³⁰	38×10 ³⁰	14 pb ⁻¹
p↑-p↑*	255	107	200	0.65	20→25	280×10 ³⁰	170×10 ³⁰	56 pb ⁻¹

* h (helion) – nucleus of the ³He atom; d (deuteron) – nucleus of the ²H atom; p (proton) – nucleus of the ¹H atom.
 * We expect that an intensity- and time-averaged store polarization P of up to 65%, as measured by the H jet, can be reached at 100 GeV. At 255 GeV we expect the polarization P to reach up to 57%. In Run-11 PHENIX had 107 and STAR 102 colliding bunches.

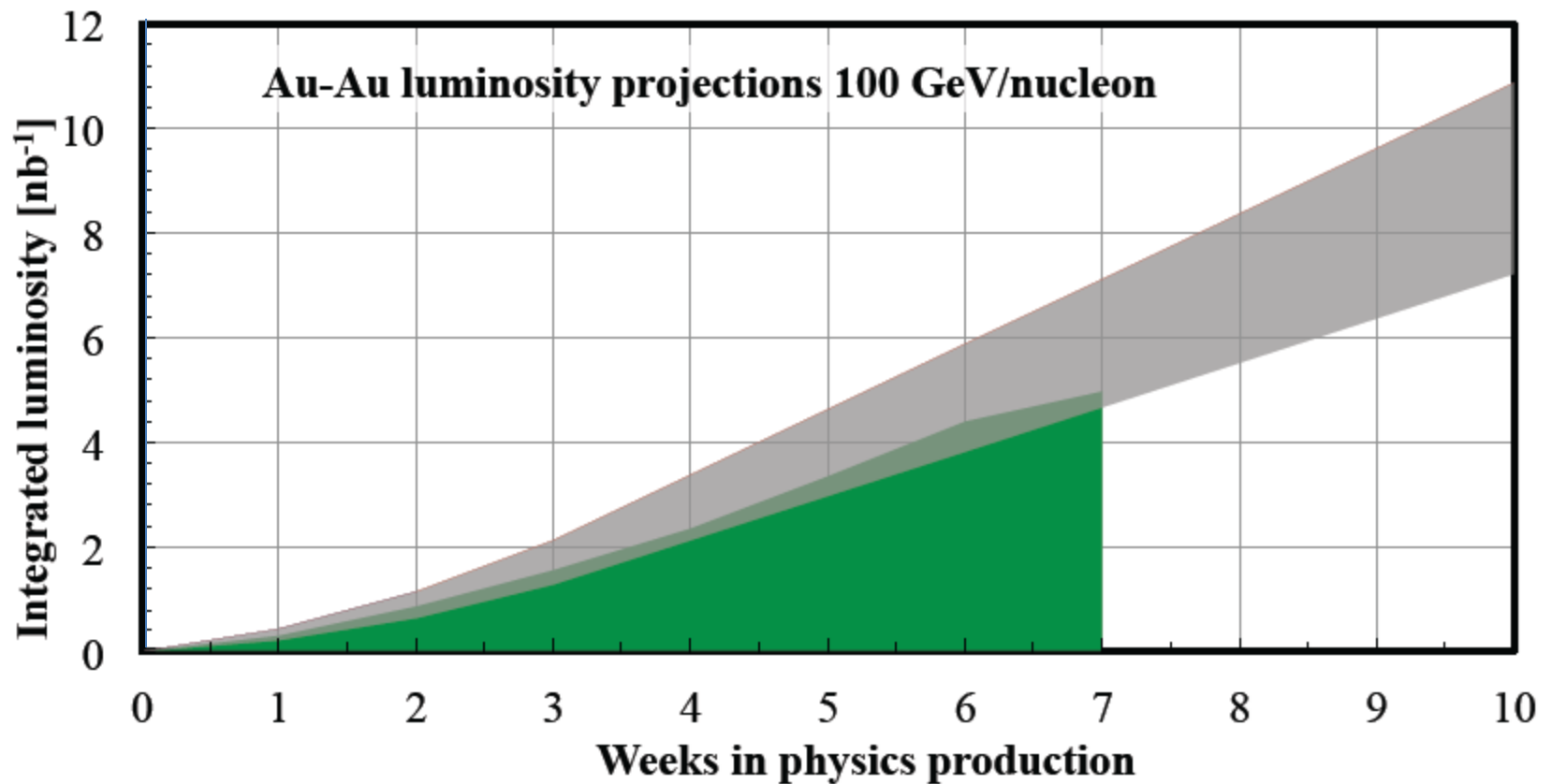



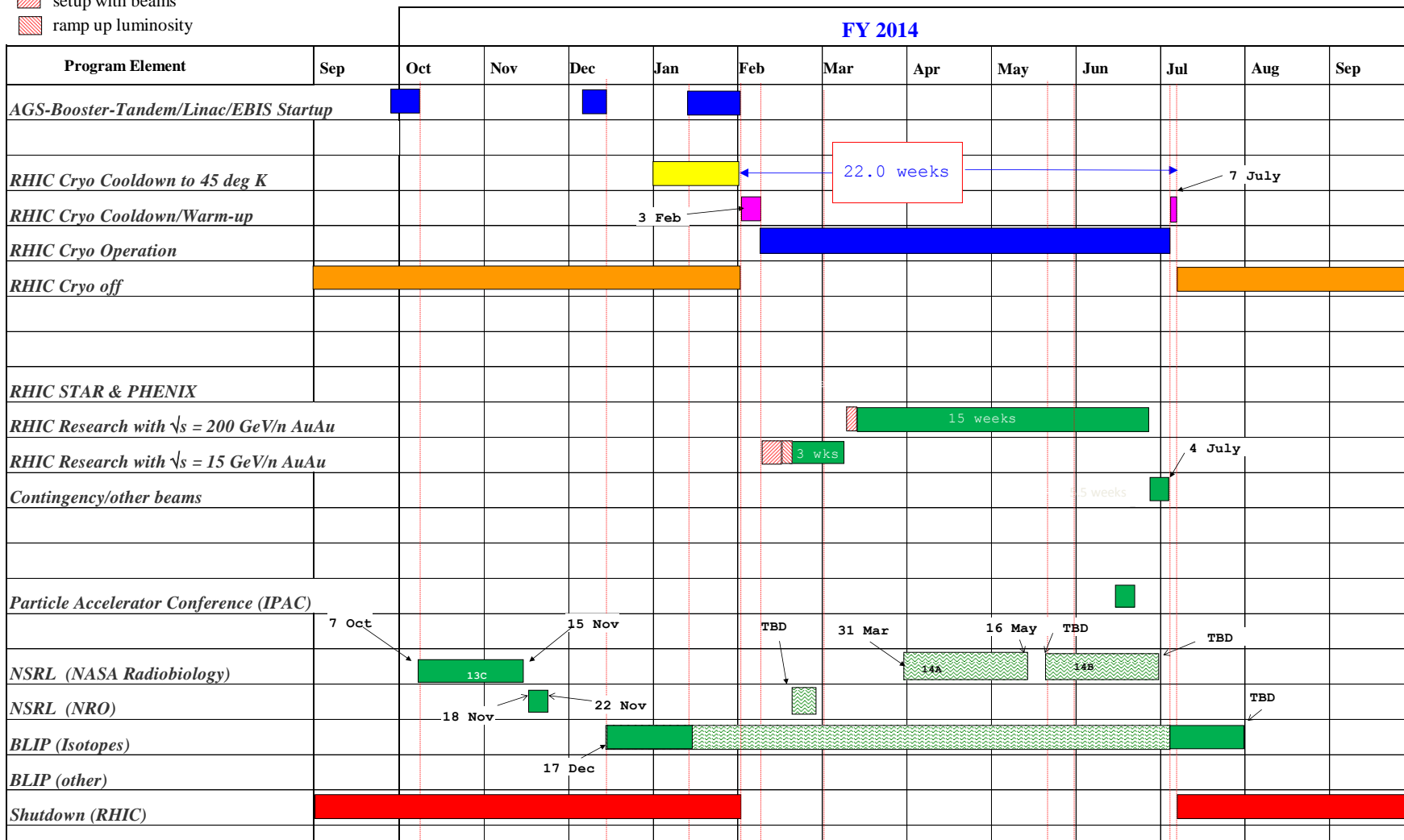


Figure 4: Projected minimum and maximum integrated luminosities for Au-Au at 100 GeV/nucleon.

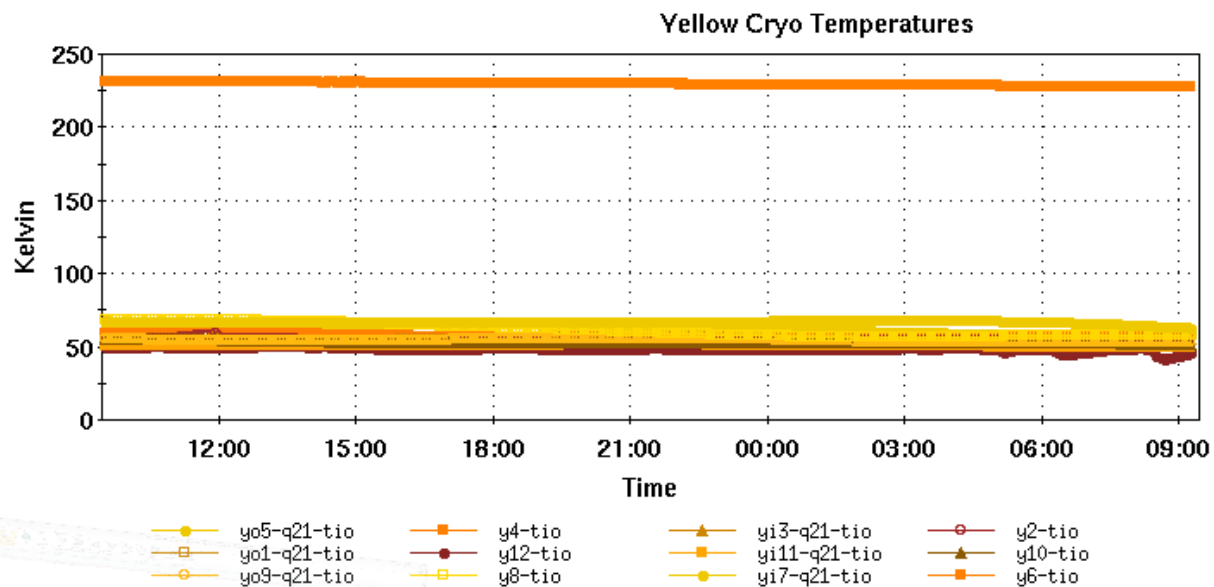
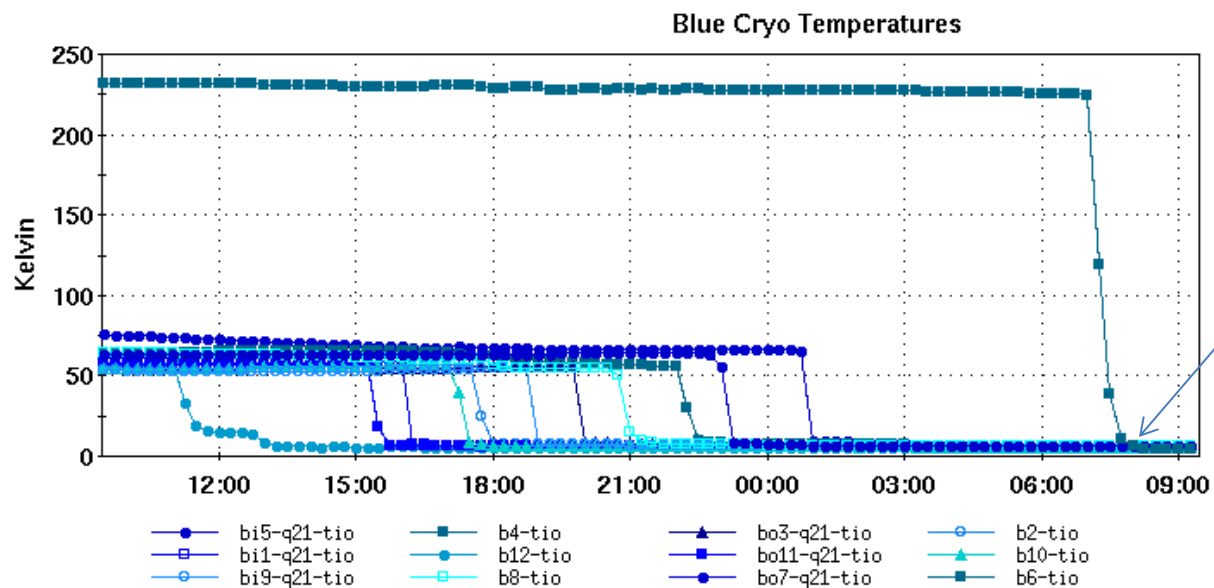
C-A Operations-FY14

planned, budget permitting

-  concurrent with RHIC
-  setup with beams
-  ramp up luminosity

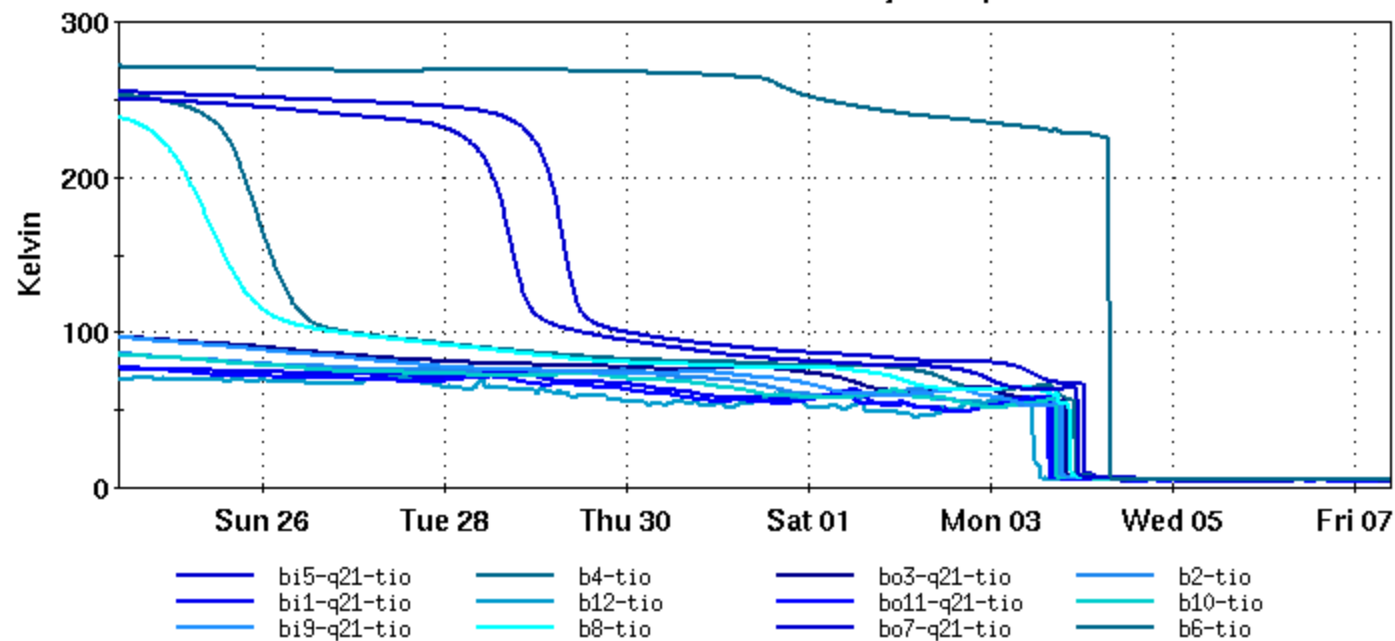


File Window Markers Analysis

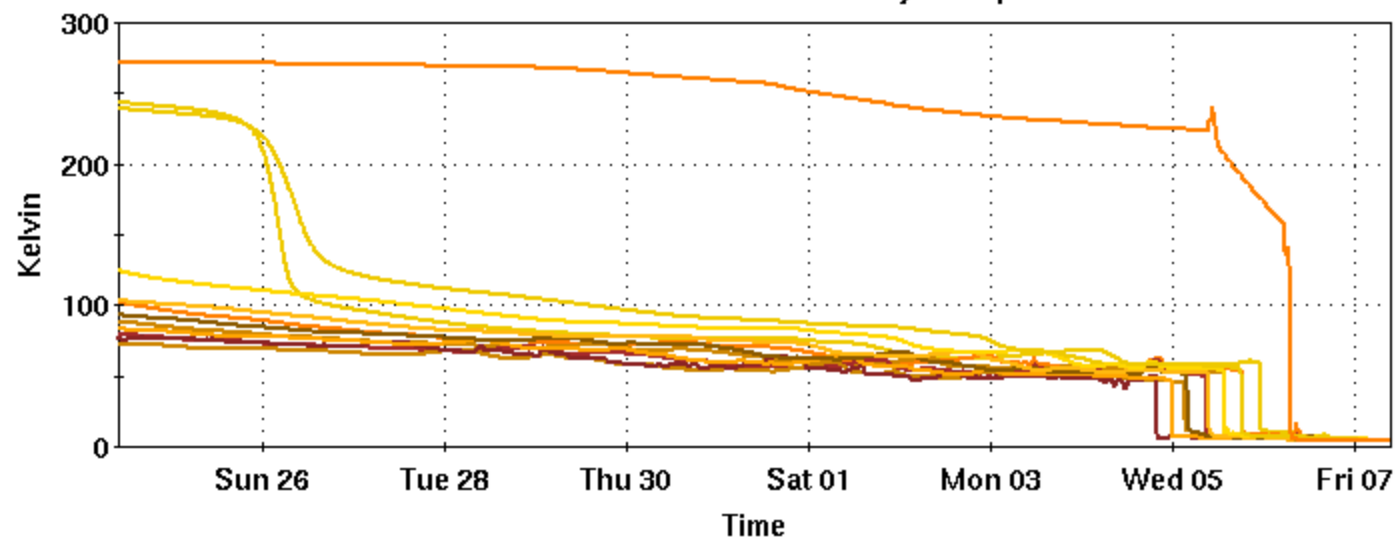


7 Feb 2014, Blue and Yellow at 4.5 deg K

Blue Cryo Temperatures

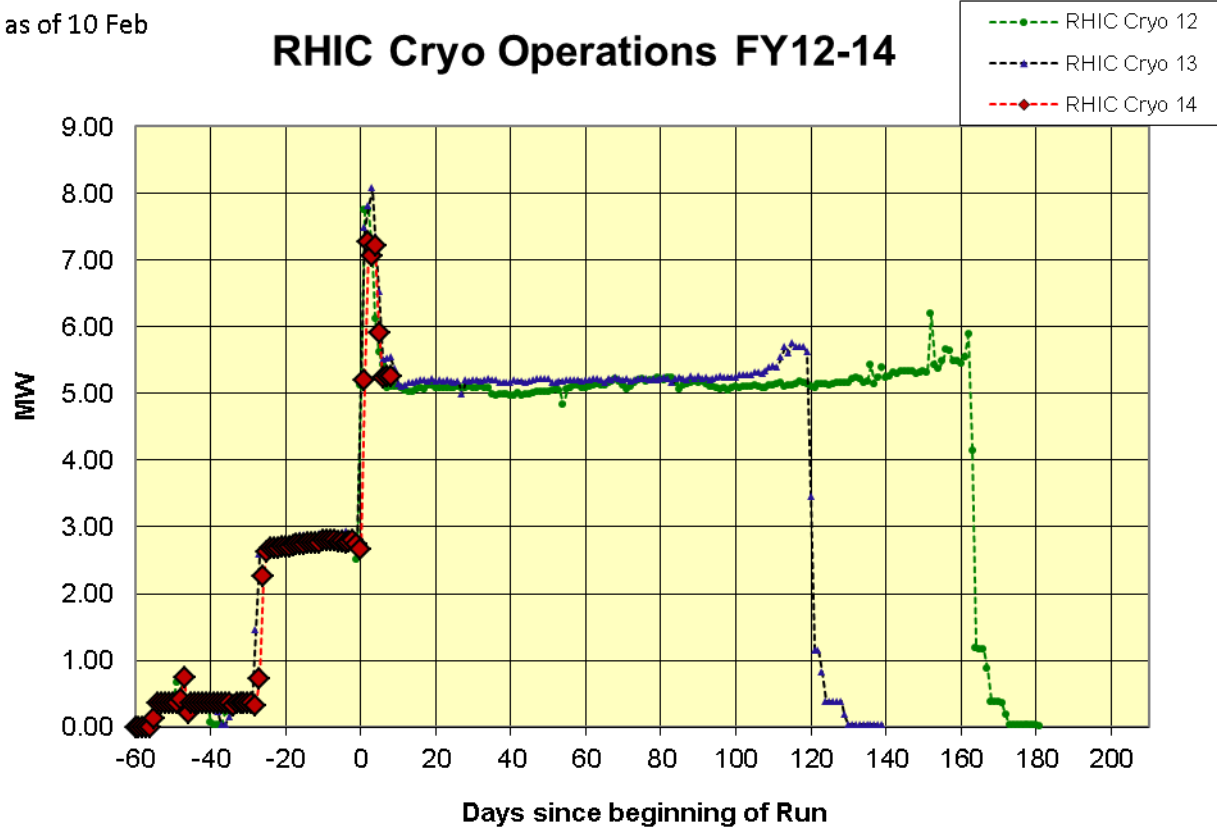


Yellow Cryo Temperatures



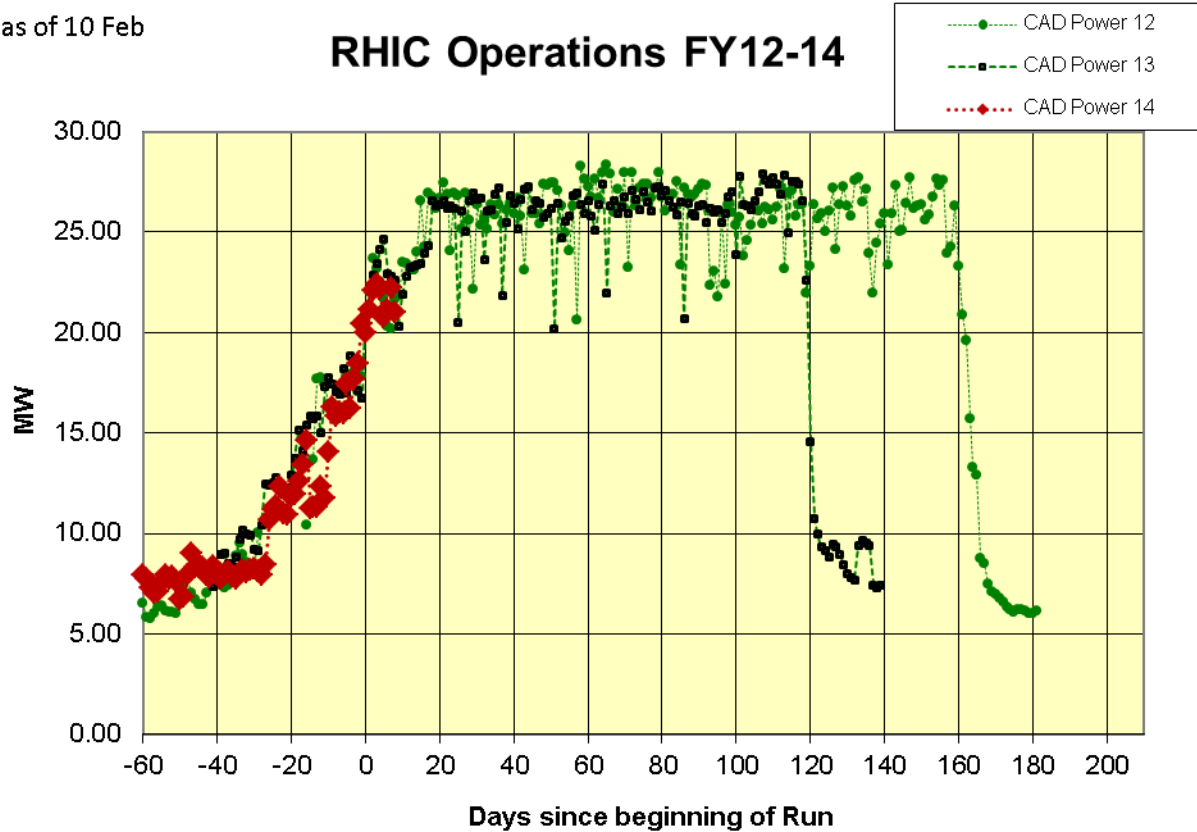
as of 10 Feb

RHIC Cryo Operations FY12-14



as of 10 Feb

RHIC Operations FY12-14



CAD POWER

	Building	Cubicle	Feeder	Transformer	Equipment	Demand (kW)
Machine Power:						
	603	23	911-13	3	B2500, W	115
	603	24	911-14	3	A2500, 911N, C(1,2), D2(914)	1382
	603	25	911-15	3	AMMPS (SIEMENS)	2160
	603	26	911-16	3	R, MG, ARF, AMMPS(LP)	2016
	603	27	911-17	3	3J, B925, 913R(HITL), Q	144
	631	6	930-1	4	SUB643, B926, 936, 924, 930-5(ALT)	2419
	631	8	930-5	5	1-2-3L, D2, 930-1(ALT)	173
	631	18		6	RHIC 4B.4C MMPS	173
	631	14	I-5F	6	He Compressor	1382
	631	19	I-5F	6	He Compressor	5530
	631	20		6	1-6A, 8A, 8B, 10A, 1101	1382
	631	21		6	I-5D, 5H, 6B	691
	631	22		6	I-2A, 4A, 12A	0
	638	B4		8	RHIC Overhead Line, RF4D.6C.STAR, MMPS T1 T2	1320
	638	A4		8	Future Overhead Line	0

MACHINE TOTAL: 18715**Experimental Power:**

631	3	912-3	4	1-2-3K, 1-2P	0
631	4	919-1	4	E, 1-2-3F	518
631	5	919-2	4	MPS, G, H1-2-3, B919, 975	346
631	9	H10-6	5	5, 6M	0
631	10	912-4	5	1, 2, 3M, 1SB, 2SB	173
631	11	H10-11	5	5N, 4N, 1000P, 1MW1-2	346

EXPERIMENTAL TOTAL: 1382**Booster MMPS Power:**

631	1B		7	Booster Out	0
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BOOSTER TOTAL: 0**CAD DEPARTMENT TOTAL: 20098**

	Trnx -3	Trnx -4	Trnx -5	Trnx -6	Trnx -7	Trnx -8	Site
AGS Demand:	5818	4493	691	7776	0	1320	20098
Equipment Total:	7862	5530	1037	7603	0	1728	39060
AGS %:	75	81	67	102	0	76	51

Who's Who for 2014

RHIC Au-Au Run Coordinator Operations:	Gregory Marr	gmarr@bnl.gov	631-344-7810 (office)
	Vincent Schoefer	schoefer@bnl.gov	631-344-8453 (office)
	Travis Shrey	shrey@bnl.gov	631-344-7451 (office)
RHIC 7.3 GeV Au-Au Run Coordinator planning:	Christoph Montag	montagc@bnl.gov	631-344-4820 (office)
RHIC 100 GeV Au-Au Run Coordinator planning:	Guillaume Robert-Demolaize	grd@bnl.gov	631-344-8215 (office)
Scheduling Physicist:	Chuyu Liu	cliu1@bnl.gov	631-344-4431 (office)
AGS liaison:	Haixin Huang	huanghai@bnl.gov	631-344-5446 (office)

For example, 20 weeks of RHIC refrigerator operation in FY 2014 could be scheduled in the following way:

Cool-down from 50 K to 4 K	1 week	
Set-up mode 1 (Au-Au at 7.5 GeV/nucleon)	1 week	(no dedicated time for experiments)
Ramp-up mode 1	$\frac{1}{2}$ weeks	(8 h/night for experiments)
Data taking mode 1	2 $\frac{1}{2}$ weeks	
Set-up mode 2 (Au-Au at 100 GeV/nucleon)	$\frac{1}{2}$ week	(no dedicated time for experiments)
Data taking mode 2 with further ramp-up	10 weeks	
Set-up mode 3 (p \uparrow -p \uparrow at 100 GeV)	1 week	(no dedicated time for experiments)
Ramp-up mode 3	$\frac{1}{2}$ weeks	(8 h/night for experiments)
Data taking mode 3+1 with further ramp-up	2 $\frac{1}{2}$ weeks	
Warm-up	$\frac{1}{2}$ week	

From Fischer et. al., RHIC Collider Projections (FY 2014 – FY 2018), 4 June 2013